



## INSTITUTE OF PUBLIC HEALTH

### A THESIS PROPOSAL SUBMITTED TO THE INSTITUTE OF PUBLIC HEALTH COLLEGE OF MEDICINE AND HEALTH SCIENCES, UNIVERSITY OF GONDAR IN PARTIAL FULFILLMENT OF THE DEGREE OF MASTER OF PUBLIC HEALTH IN HEALTH INFORMATICS

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<b>Full title of the research project</b>	<b>Geographic accessibility and utilization of institutional delivery and associated factors among rural reproductive age mothers in Jimma Horro Woreda, Oromia region, Ethiopia, 2012</b>
<b>Duration of project</b>	<b>November 2011 - June 2012</b>
<b>Study area</b>	<b>Jimma Horro Woreda Oromia Regional State, South West Ethiopia, 2012</b>
<b>Total cost of the project</b>	<b>24,653.86 Eth. Birr</b>
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**Acronyms**

ANC – Antenatal Care

CSA – Central Statistical Authority

FMoH – Federal Ministry of Health

GIS – Geographic Information System

GPS – Global Positioning System

ID - Institutional Delivery

IRB - Institutional Review Board

ORHB- Oromia regional Health Bureau

SDA - Skilled Delivery Attendant

SPSS – Statistical Package for Social Science

UTM – Universal Transverse Mercator

WHO – World Health Organization

WSG - World Geodetic System

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## **Summary**

**INTRODUCTION:** In Ethiopia, a country which is one of the six countries contributing 50 % of at least 1,600 maternal deaths daily worldwide from the complications of pregnancy and childbirth. Besides, one in 14 Ethiopian women faces the risk of death during pregnancy and childbirth. Even though there have been improvements in maternal health services utilization, yet, 96% of births take place at home in rural Ethiopia.

While various factors have made rural access and utilization of institutional delivery service utilization a significant problem for rural women, the geographic distance between a mother's location and the place in which she receives the service is one of the most important factors. Rural populations are particularly disadvantaged as they often lack reliable means of transportation. The purpose of this study is to assess geographic accessibility and delivery service utilization among rural reproductive age women using some applications Geographic Information System (GIS).

**OBJECTIVE:** The aim of this study is to assess geographic accessibility and utilization of institutional delivery as well as associated factors among rural reproductive age women in Jimma Horro woreda, Oromia region, South West Ethiopia.

**METHODS AND MATERIALS:** A community-based cross-sectional study will be conducted from November to June 2012 Jimma Horro woreda, Oromia regional state, Ethiopia. From 21 rural kebeles five clusters (kebeles) will be selected randomly. Data will be collected using structured questionnaire. Data on geo-reference coordinates of respondents as well as health facilities locations and routes from village center point to nearest health centers will be recorded using hand-held Global Positioning System (GPS) units. Integrating with woreda base map obtained from Central Statistical Agency (CSA), network distance measurement will be processed Network Analyst in ARCGIS 9.3. Data will be entered into EpiInfo and transported to SPSS 16.0 for analysis.

**WORK PLAN AND BUDGET:** The duration of the project will be from November to June 2012 with a total budget of 24,653.86 Eth birr.

**Key words:** Geographic accessibility, Institutional delivery, Delivery service utilization



## **Introduction**

### **Statement of the problem**

In most developing countries, women of reproductive age constitute more than one-fifth of the total population. Death of a woman, who in most developing countries plays the principal role in rearing of children and the management of family affairs, is a significant social and personal tragedy(1, 2).

Many of these women live in remote areas that are too far from a road, let alone a health facility. Ethiopia is one of the six countries contributing 50 % of at least 1,600 maternal deaths daily worldwide from the complications of pregnancy and childbirth. And, one in 14 Ethiopian women faces the risk of death during pregnancy and childbirth (2-5).

And Pregnancy and childbirth and their consequences are still the leading causes of death, disease and disability among women of reproductive age in developing countries more than any other single health problem(6, 7).

One of the most critical interventions to prevent maternal mortality and morbidity is to ensure that women receive appropriate care during delivery care which is crucial for both maternal and prenatal health. And it is an important indicator in monitoring progress towards Millennium Development Goal 5 to reduce the maternal mortality ratio by three quarters between 1990 and 2015 (8).

However, globally, it is estimated that 34% of the mothers deliver with no skilled attendant; this means there are 45 million births occurring at home without skilled health personnel each year. Moreover, even though there have been improvements in maternal health services utilization, yet, 96% births take place at home in Ethiopia(3, 9, 10).

While various factors have made rural access and utilization of institutional delivery utilization a significant problem for rural women, the geographic distance between a

mother's location and the place in which she receive the service is one of the most important factors (11, 12).

Geographic accessibility exerts a dual influence on health care utilization. Long distance can be an obstacle to reaching a health facility as well as a disincentive to even try to seek care. Rural populations are particularly disadvantaged as they often lack reliable means of transportation (13).

Studies showed that, Geographic accessibility of the services is one of the most important factors associated with utilization of maternity care (14). Because geographical factors such as distance between home and health institutions are part of the first and the second delay and suggested an influence on the choice of delivery place (15).

Distance prevents many mothers from accessing maternal services which has a major impact on excluding poor rural women from maternity facilities in low-income countries. This in turn impacts negatively upon broader initiatives towards safer motherhood and reducing maternal and neonatal mortality (16).

In Sub-Saharan Africa (SSA) and other low-income countries, distance contributes to the time required to access health services (17). Moreover, in rural areas of Ethiopia distance and travel time are the crucial determinants (18).

## **Literature review**

Study in Dakota county-level data using geographic information systems (GIS) software showed women from over half of the state's counties, making up nearly 18% of all births were found to be over 40 miles to the hospital in which they gave birth (12).

Study done in India showed the association between Geographical Access and institutional delivery as follows .Those mothers with the distance of 31 + km,16-30km,6-15 km and up to 5km to the hospital had 13.4%,18.5%,23.8% and 32.0% institutional delivery respectively. With respect to educational level of mothers and institutional delivery the study revealed 44.2% mothers with secondary level and 67.4% with higher educational level had institutional delivery but 13.0% of with none of educational level used institutional delivery. Moreover it showed 25% of variation in institutional delivery care-seeking in rural areas is accounted for by variation at the village level (16).

Study in Cambodia found that distance from both health centre and hospital had a strong deterrent effect on health facility use for childbirth in bivariate, but not multivariate analyses (17).

Study done in rural Vietnam to determine Utilization of delivery services at the primary health care level indicated preference of delivery place was affected by marital status of the mothers. Single or divorced women may be poorer but enjoy greater autonomy than those currently married (18).

Study conducted in Tajikistan revealed most women have secondary education but 40% of them delivered at home .There is no differential in service use up to secondary education, but those with higher education are more likely to deliver in a facility than the rest (19).

Different studies on determinants of delivery service considering age find either no effect of age or a higher use of skilled attendance among older mothers compared to younger mothers (20, 21).

Study done in Zambia showed that among 76% of the respondents have to walk to the clinic, 50% have to walk for 2 h or more. While 71% of those living within 2 h walking distance delivered in a health institution with only 35% of those living further away did. Among the study subjects who walk more than two hours to get institutional delivery service 65% of them gave birth at home. In relation to knowledge about risk factors and danger signs of pregnancy and place of delivery the study showed 54% of those with inadequate knowledge gave birth out of health institution. Regarding marital status and place of delivery, among those who are married majority (62%) were delivered out of health institution. Delivery out of health institution was also reported 27% and 50% among high and low educational status respectively. 15 % of mothers with formal employment delivered outside health institution while it was 53% among mothers who are informally employed (22).

Another study in Zambia showed that utilization of facility delivery service was strongly associated availability of obstetric emergency service within 15 km. Moreover the study found a decrease in the odds of facility delivery by 45% for each unit increase in long distance that corresponds to a 36% decrease in odds of facility delivery for each doubling of distance (23).

Study done in south Tanzania revealed that among 46.7% of respondents who delivered in a health facility in their most recent delivery, 35% delivered in a hospital level and 65% delivered in dispensaries or in health centers. In relation to distance and delivery service the study indicated that the proportion getting delivery in health institution decreased with increasing distance to the health facility from 50.1% among women residing within 5 km of a health facility to only 20.2% among those residing more than 5 km from a health facility. In addition Women who started ANC clinic early and those who had 4 or more ANC visits were more likely to be assisted during delivery by a skilled attendant compared to those who booked late for ANC and those with fewer than recommended number of ANC visits (24).

Study done in Kenya showed that 44.8% of women interviewed identified distance from health centers or lack of transportation as a barrier to their uptake of skilled care for delivered (25).

Study in Tigray, in Saharti-Samre district indicated that 95.9% births took place at home compared to 4.1% births at different health facilities of the district. Out of those who delivered at health institutions, 0.3% were at the health post and the remaining were at the health center. Regarding educational level and place delivery the study revealed 38% women with secondary education were more likely to use the HF for delivery place than 3% illiterate mothers. 93.5% and 6.5% of mothers who had at least one ANC follow up delivered at home and health facility respectively and it was 98.5% and 1.4% for those who hadn't ANC follow up. Mothers who had husband encouragement had a 30% higher risk of giving birth at HF compared with those who did not have. 100% divorced mothers gave birth at home compared to 90% single mothers. In addition it showed more 40.6% of mothers with secondary education were assisted by skilled birth attendants compared with 4.6% illiterate mothers and Mothers who had antenatal visit were more likely to be assisted by skilled birth attendants than women who did not have ANC visit (26).

Study done in Afar region showed that among women who delivered in health institutions has decreased varied from 36% to 14% among those who traveled less one hour and more than two hours respectively. A substantial discrepancy in institutional delivery was observed among mothers who had ANC visit(s) and not with value of 91% and 9% respectively (27).

Study in north Gondar revealed Mothers whose educational status was secondary high school and above were about 11 times more likely to give birth at health institutions than women with other levels of education. Women without access to radio were less likely to deliver at a health institution than women with access to radio. Regarding to place of residence and health institution delivery the study showed Women who resided in rural areas were more likely to use the services than their urban counterparts and women who did not have any registered antenatal visit were less likely to give birth at health facilities (28).

Study done in southern Ethiopia showed that 94% of births are delivered at home. Among these, 28% were assisted by TBAs, 61% by relatives or others and 5 %

delivered without any type of assistance at all and only 1.2% delivered trained medical personnel only in rural area (1).

Study done in Jimma town showed Woman between 35-39 are less likely to deliver in HFs when compared to those between 15-39 and those with formal education are more likely to deliver in HFs. Further more women who attended ANC follow up women to whom their husbands and relatives prefer Skilled Delivery Attendant (SDA) and those who can decide by themselves about getting Institutional Delivery (ID) services are more likely to deliver in health facilities. With regard to husband's education the study revealed Women whose husbands have formal education are likely to intend to deliver in Health facilities(29).

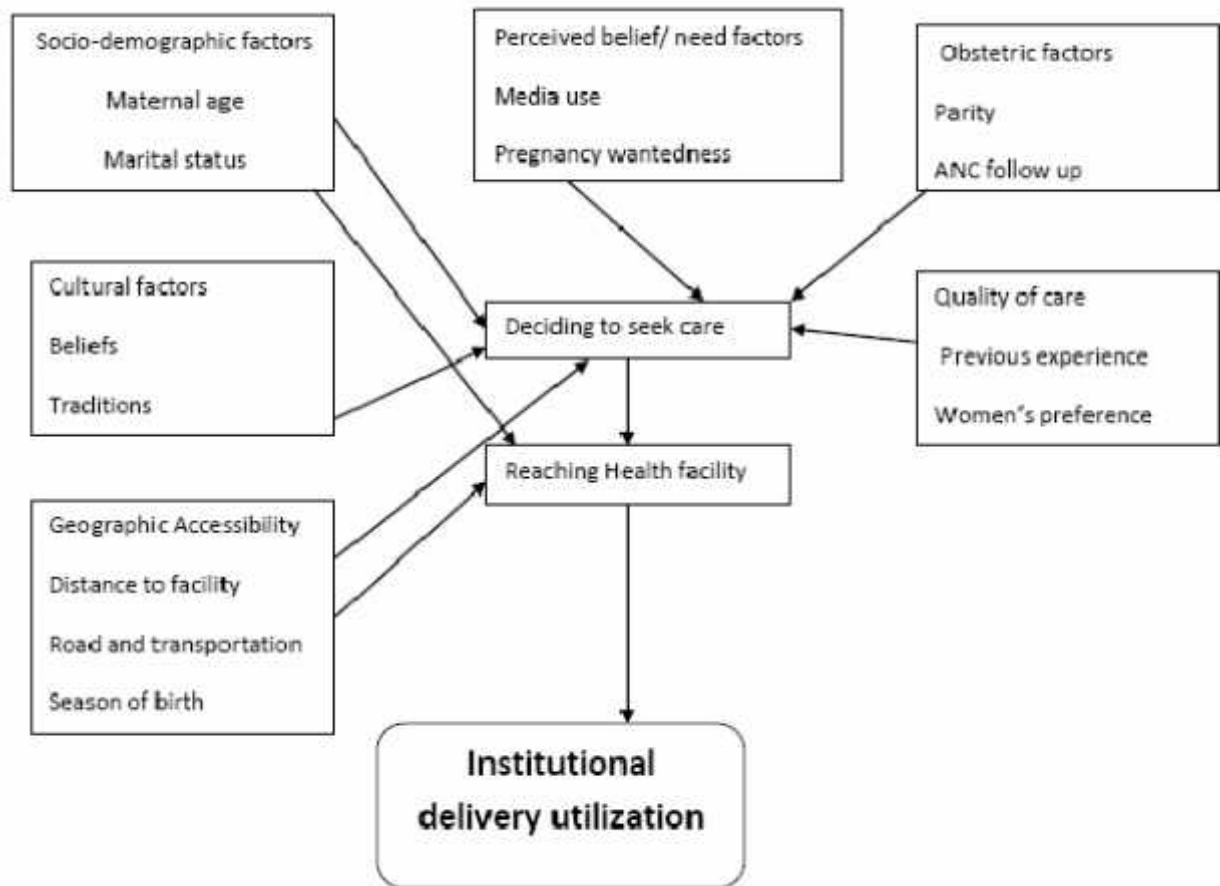
## **Justification**

Delivery is a critical instance in which decisions about unanticipated, serious complications must be made. And institutional delivery is one of the most important interventions to avoid complications related to pregnancy.

There have been improvements in maternal health services utilization such as antenatal care coverage and Tetanus Toxoid immunization. However, institutional delivery remained very low especially in rural Ethiopia.

Most of previous studies focused on the self-reported travel time and distance to assess geographic accessibility of delivery service and its association with service utilization. In this study GIS will be used which could help to explore the geographical accessibility and utilization of institutional delivery services.

Therefore the present study is aimed to assess the geographic accessibility on institutional delivery utilization with the objective to explore and draw attention to the differential degree of difference and disparity in access to institutional delivery service and the other correlates in rural kebeles of Jimma Horro woreda. In line with this the findings will also provide baseline information for concerned bodies in understanding utilization of delivery service that further may help to strengthen institutional delivery services access and utilization.



**Figure 1: Conceptual framework for Institutional delivery utilization**



## **Objectives**

### **General objective**

- To assess the geographic access to health centers, level of Institutional delivery utilization and associated factors among rural reproductive age mothers in Jimma Horro Woreda, Oromia region, Ethiopia, 2012

### **Specific objectives**

- To determine institutional delivery utilization
- To identify factors associated with institutional delivery
- To describe geographical access to health centers of mothers delivered in the last two years to health institution

## **Methods and materials**

### **Study area and period**

The study will be undertaken from November to June, 2012 in Jimma Horro Woreda, located in Kellem Wellega Zone, Oromia Regional State, South West of Ethiopia. Jimma Horro District is located 652 Km South West Addis Ababa. According to CSA population projection from 2007 census, total population of the woreda for the year 2011 is 51,372. There are also two health centers, 16 health posts, with 87 technical and non-technical staffs and three private small clinics.

### **Study design**

The study will employ a quantitative community-based cross-sectional study design.

### **Source population**

The source population will be all child bearing age women (15 -49 ages).

### **Study population**

The study population is all child bearing age mothers who had birth within two year preceding the data collection.

### **Inclusion and exclusion criteria**

#### **Inclusion criteria**

Mothers who had birth within two year preceding the data collection period will be included.

#### **Exclusion criteria**

Those who are not permanent resident of the study area (less than 1 year) will be excluded from the study area.

### **Sample size and sampling procedures**

#### **Sample size**

The required sample size of the study participants will be determined by single population proportion formula.

$$n = \frac{(Z_{\alpha/2})^2 P (1-P)}{d^2}$$

Where;

n = Number of reproductive age women to be studied;

Z = standardized normal distribution value for the 95% Confidence Interval, which is 1.96

P = 4% (for rural mothers) (10).

d = Margin of error is taken as 2.5%

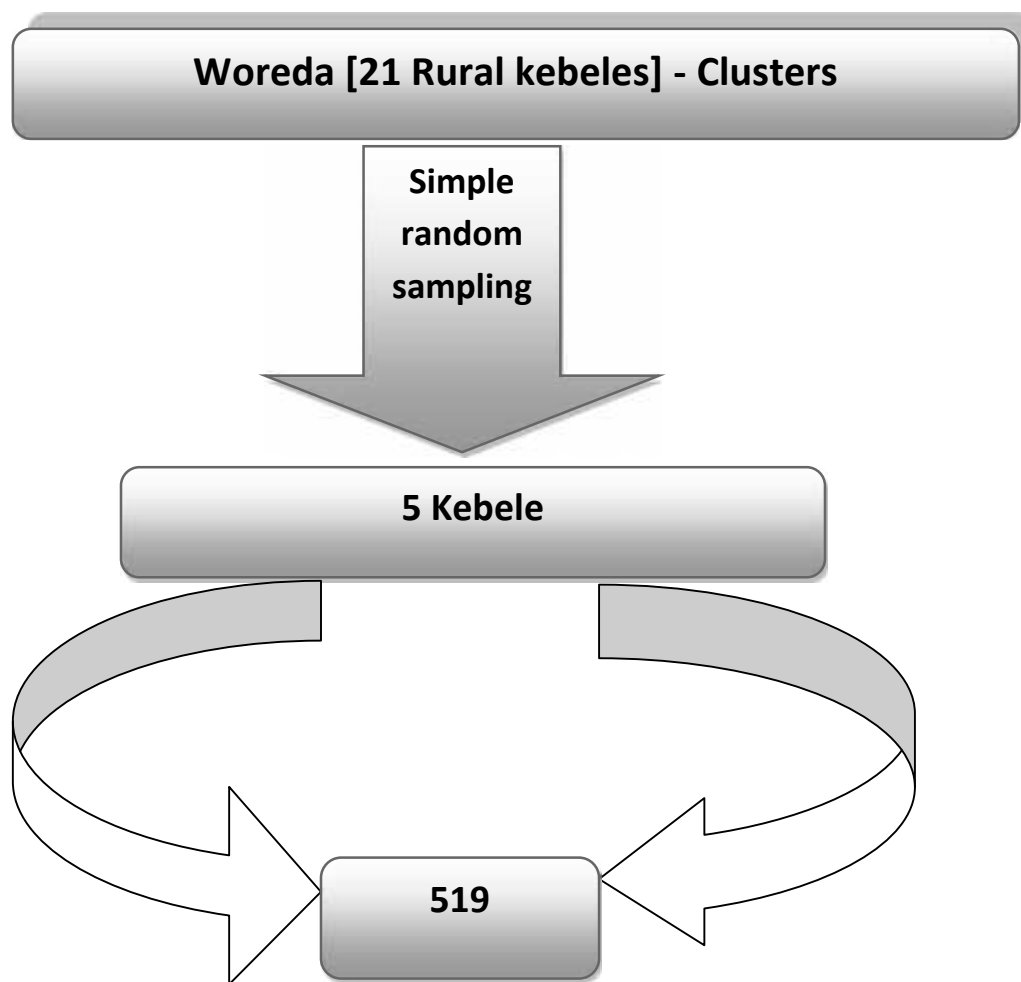
$$n = \frac{(Z_{1/2})^2 P (1-P)}{d^2} = \frac{(1.96)^2 (0.04) (0.96)}{(0.025)^2} = 236$$

Considering the design effect and non response

$$236 * 2 + (10\%) = \underline{519} \text{ will be the final sample size.}$$

### **Sampling procedures**

Twenty one rural kebeles in the woreda will be taken as logical clusters. To recognize the study units, five Kebeles will be selected using lottery method. Then all target reproductive age mothers in the selected kebeles will be included in the study.



**Figure 2: Schematic presentation of sampling procedure**

## Variables of the study

### Dependent variables

Institutional delivery Utilization

### Independent variables

Table 1: List of independent variables of the study

<b>socio-demographic variables</b>	Current maternal Age
	Marital status
	Family size
	Current maternal Age
	Marital status
	Family size
	Current maternal Age
	Marital status
	Age at first pregnancy
	Age at last pregnancy
<b>Obstetric history</b>	Birth order
	Pregnancy planned
	Number of births
	Number of abortions
	Birth complications
	Previous institutional delivery utilization
	ANC utilization in previous pregnancies
	ANC utilization in the most recent pregnancy
	Number of ANC visits for the last pregnancy
<b>Geographic factors</b>	Physical distance from village centers to the nearest health center

## **Operational definition**

**Institutional delivery:** is a child-birth happening with skilled assistance in an institution which is built, equipped, and managed to provide this service as one of its functions.

**Access to service:** availability of health facility providing skilled birth service within 5 km network distance or possibly 1 hour travel time.

**Skilled attendant:** refers exclusively to people with midwifery skills (for example, doctors, health officers, midwives, nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose or refer obstetric complications

## **Data collection procedures**

The data will be collected between 28<sup>st</sup> March and 11<sup>st</sup> April 2012.

Center of each village will be determined and network distance between the center and the nearest health center will be measured using hand-held GPS instrument.

Location of sampled households, route, and health facilities in the study area will be positioned by 6 trained field workers with data collection experience using hand-held GPS (Garmin H72).

Other trained field data collectors will collect the location information and other relevant socio-demographic and maternity data using structured survey questionnaire. For all women, an ask-and-answer procedure will be offered by an interviewer.

The fieldworkers will be divided into five teams of one GPS location data collector and one interviewer; and the movements of each team coordinated by two other supervisors and the principal investigator.

All the relevant shape geographical features will be re-projected to WGS\_1984\_UTM\_Zone\_37N. The GPS data will be collected in WGS 84 datum, and in decimal degrees with 6 places of precision.

Kebele and district boundaries and polygon maps for the entire study area and other geographic features will be obtained from the Ethiopia CSA. Geographic data of health facilities will be obtained from CSA; these will be checked by Woreda Health Office if there is any omission, duplication, and error.

### **Data processing and analysis**

Kebele population data will be linked to kebeles' polygon map of the woreda. ARCGIS 9.3 will be used to determine spatial accessibility (distance) between a mother and the nearest health post, nearest health center and to the nearest road.

All the questionnaires will be checked visually, coded and entered into EPINFO® and transported to SPSS® version 16.0 software package for analysis. For controlling errors 10% of the questionnaire will be double entered, also frequency checks will be done. The data will be analyzed using logistic regression to determine the effect of various factors on the outcome variable and to control confounding effect.

ARCGIS Arc map and network analyst will be used to integrate the map obtained from CSA and data collected using GPS and to analyze distance measurements.

The results will be presented in the form of tables, figures and text using frequencies and summary statistics such as mean, standard deviation and percentage to describe the study population in relation to relevant variables.

P-value less than or equal to 0.05 will be taken as cut of value to be significant. The degree of association between independent and dependent variables will be assessed using odds ratio with 95% confidence interval.

Interviewers will be trained for five days focusing on skills of conducting the interviews, field GPS data collection and recording, importance of informed consent and how to introduce themselves to respondents; and questionnaire will be pre-tested to measure the clarity of the questions to both the data collectors and respondents.

### **Ethical consideration**

The proposal will be reviewed and approved by the Institutional Review Board (IRB) of University of Gondar. Permission to conduct the study will be also obtained from the Oromia Regional Health Bureau (ORHB) and Jimma Horro Woreda Health Office.

Informed consent will be obtained from each study subject. Each respondent will be informed about the objective of the study that it will contribute necessary information for policy makers and other concerned bodies. Any involvement in the study will be after their complete consent is obtained. Any study subject who is not willing to participate in the study will not be forced to participate. They will be also informed that all data obtained from them would be kept confidential by using codes instead of any personal identifiers and is meant only for the purpose of the study.

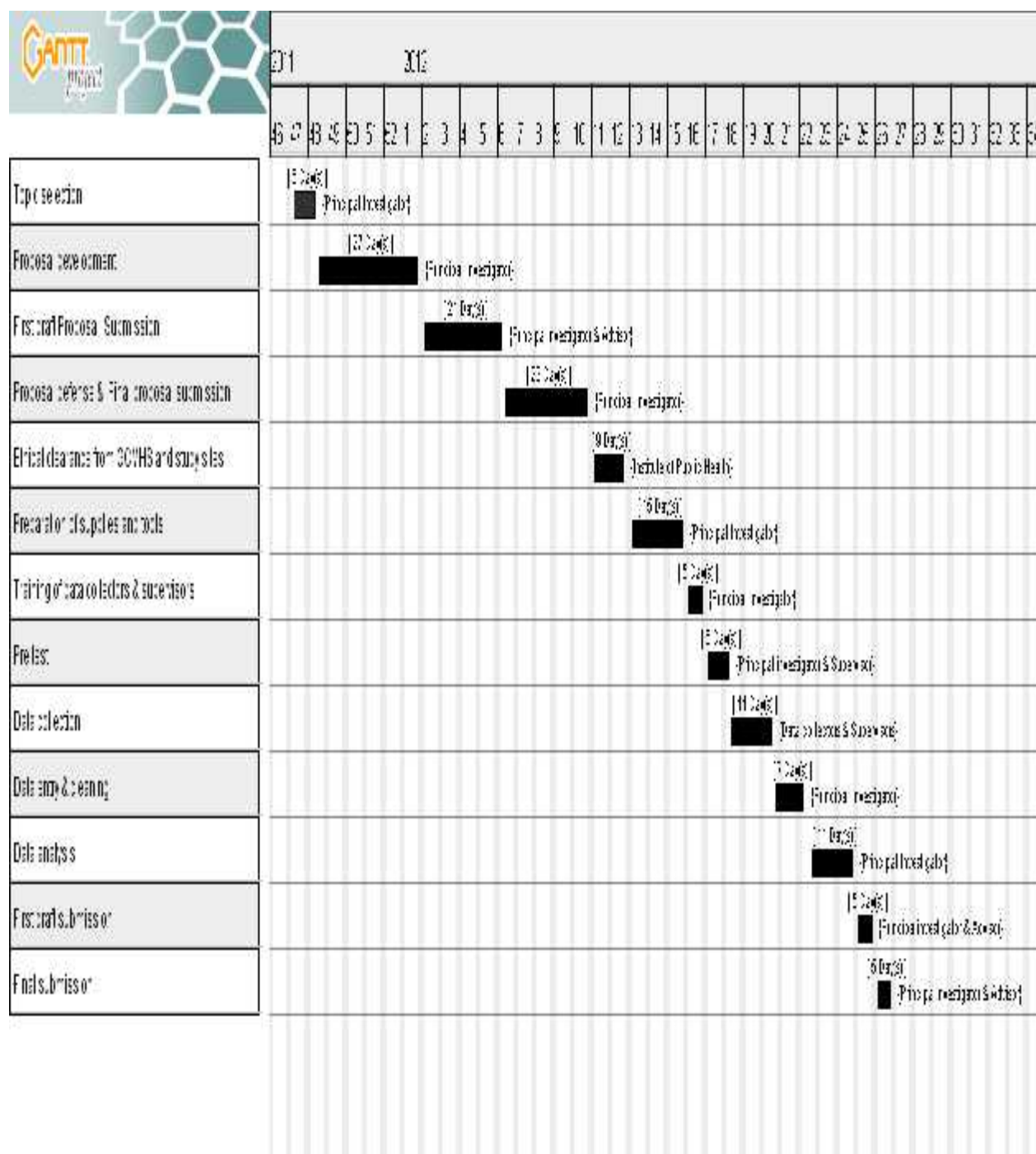
### **Dissemination of result**

Results of this study will be disseminated through publication, presentation on annual scientific meeting, conferences, seminars etc. A copy of it will be offered to University of Gondar Institute of Public Health, FMOH, Oromia Regional Health Bureau, Jimma Horro Woreda Health Office.



## Work plan

Table 2: Work plan for thesis proposal on Geographic Accessibility and factors associated with Institutional delivery utilization among reproductive age mothers in Jimma Horro Woreda, Oromia region, Ethiopia, 2012



## Budget

Table 3: Personnel Cost budget breakdown

<b>Personnel Cost</b>					
<b>Personnel</b>	<b>Minimum Qualification</b>	<b>Rate</b>	<b>Duration</b>	<b>Number employed</b>	<b>Total</b>
Surveyor	Diploma	70/day	13 day	6	5460
Data collector	Diploma	35/day	13 day	6	2730
Guide	-	35/day	13 day	10	4550
Supervisor	MSc(M&E)	100/day	13day	2	2600
Total					15340

Table 4: Equipment and Supplies budget breakdown

<b>Equipment and Supplies</b>				
<b>Item</b>	<b>Unit</b>	<b>Number Needed</b>	<b>Cost per unit</b>	<b>Total Cost</b>
Battery(alkaline)	Pcs	100	10	1000
Paper A4 size	Rim	15	85	1275
Duplication	Page	2745	0.60	1647.60
Clip board	Number	10	25	250
Pencil	Pcs	10	1	10
Pen (Bic)	Pcs	10	3	30
Total				4212.60

Table 5: Transport cost budget breakdown

<b>Transport cost</b>				
<b>Item</b>	<b>Unit</b>	<b>Number Needed</b>	<b>Cost per unit</b>	<b>Total Cost</b>
Fuel	Lit	110	26	2860
Total				2860

Table 6: Total Budget for thesis proposal on Geographic Accessibility and factors associated with Institutional delivery utilization among reproductive age mothers in Jimma Horro Woreda, Oromia region, Ethiopia, 2012

<b>Total Cost</b>	
Personnel Costs	17680
Equipment and Supplies	4,212.60
Transport Costs	2860
Contingency (10%)	2241.26
Total	24653.86

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## Annexes

### Annex I: Questionnaire for community based survey on factors associated with utilization of institutional delivery services in Jimma Horro Woreda, Oromia Region

Verbal consent

Hello! My name is \_\_\_\_\_ member of a team that is collecting some information on institutional delivery service utilization and associated factors in Jimma Horro woreda.

You are kindly requested to be included in the study, which will have importance in understanding institutional delivery service utilization. The interview will take about 25 minutes. No information concerning you, as individual will be passed to another individual or institution without your agreement.

Your participation is voluntary and you have the right to not participate fully or partially. If you agree to be included in the study I will start my questions by asking general identification points. Only honest answers would contribute to improvement of institutional delivery service utilization.

The study has approval from Gondar University, College of Medicine and Health Sciences, School of Public Health. "My I continue?"

If yes, continue interviewing

If No, thank and stop interviewing

Name of the interviewer \_\_\_\_\_ Sign. \_\_\_\_\_ Date of interview \_\_\_\_\_

Name of the supervisor \_\_\_\_\_ Sign. \_\_\_\_\_ Date \_\_\_\_\_

#### Part I

##### Household identification

001. Questionnaire Code \_\_\_\_\_

002. Kebele name: \_\_\_\_\_

003. Village name \_\_\_\_\_

004. How long have been living in this town? \_\_\_\_\_ (if less than 1 year preceding the study next house)

005. When was the date you gave birth regardless of the outcome of pregnancy \_\_\_\_/\_\_\_\_/\_\_\_\_ [dd/mm/yyyy]  
(If more than three years preceding the study next house)

Time table for visiting/revising a household

	First visit	Second visit	Third visit
Date			
Interviewer			
Result			

006. Results of visiting: 1.Completed, 2.Rejected, 3.No response, 4.partially responded, 5.other

N.B. Please fill on each answer sheet as follow: Time of start of interview \_\_\_\_\_

Time of end of interviewed \_\_\_\_\_

## **Part II**

<b>Questions on socio-demographic characteristics</b>				
Question #	Questions	Alternative choice for Responses	Code	Skip to
101	Current maternal age(at time of interview)	_____years		
102	What is your religion?	1. Muslim 2. Protestant 3. Orthodox 4. Catholic 99. Other specify_____	1 2 3 4 99	
103	What is your current marital status?	1. Married and currently living together 2. Separated 3. Divorced 4. Widowed 5. Cohabited 6. Single[never married]	1 2 3 4 5 6	
104	What is the highest level of schooling you have ever attended?	1. Never attended 2. Only read & write 3. Primary[1 – 8] 4. secondary[9 -10] 5. 10+ 99. Other Specify_____	1 2 3 4 5 99	
105	What is your occupation?	1= House wife 2= Farmer 3= Employed[waged] 99. Others specify_____	1 2 3 99	
106	What is the highest level of	1. Never attended	1	



	schooling you husband have ever attended?	2. Only read & write 3. Primary[1 – 8] 4. secondary[9 -10] 5. 10+ 99. Other Specify_____	2 3 4 5 99	
107	What is your occupation?	1= Farmer 2= Merchant 3= Employed[waged] 99. Others specify_____	1 2 3 99	
108	What is the number of people who live usually in this household?	_____(in number)		
109	What is the average family income per months?	_____ETH birr		
110	Do you have radio in your home?	1. Yes 2. No	1 2	If 2 skip to No Part III
111	Do you usually listen to a radio at least once a week?	1. Yes 2. No	1 2	

### **Part III**

<b>Obstetric history</b>				
Question	Questions	Alternative choice for Responses	Code	Skip to
201	Age at first marriage	_____years		
202	Age at first pregnancy	_____years		
203	Age at last pregnancy	_____years		
204	Birth order	_____th		
205	Is the recent pregnancy planned?	1. Yes 2. No	1 2	

206	How many times have you been pregnant?	1. Number of Pregnancies:_____ 2. Number of abortions: _____		
207	Have you ever experienced any abortion?	1.Number of spontaneous:_____ 2.Number of Induced:_____		
208	How many times have you given birth?	1. Number of children alive_____ 2. Number of children died:_____ 3. Number of still birth_____		
209	Have you ever experienced birth complications in previous pregnancies?	1. Yes 2. No	1 2	
210	Have you ever experienced birth complications in the immediate pregnancy?	1. Yes 2. No	1 2	
	Have you ever given birth in health institution in previous pregnancies?	1. Yes 2. No	1 2	

#### **Part IV**

<b>Questions on ANC utilization for all women</b>				
301	Have you ever attended ANC for the previous pregnancies?[not for the recent one]	1. Yes 2. No	1 2	
302	Have you ever visited a health institution for ANC check up while you were pregnant for the most recent pregnant?	1. Yes 2. No	1 2	
303	Where did you attend your	1. Hospital	1	

	recent ANC visit?	2. Health center 2. Health post 3. Private clinic 99. Others	2 3 4 99	
304	How often did you see?	_____times		
305	In the recent pregnancy, when did you start the follow up?	1. After _____months of amenorrhea 2. I don't know the exact months		

#### **Part IV**

<b>Questions for all women interviewed</b>				
Question	Questions	Alternative choice for responses		
401	Where do you deliver your last child?	1. At home 2. In health facilities	1 2	
402	Who assisted you?	1. Health worker 2. Health extension worker 3. TBA 4. Relative/Neighbor 99.others	1 2 3 4 99	
403	How long do you travel from your home to the nearest health center?	_____km		
404	How long does it take to travel from your home to the nearest health institution?	_____Hours		
405	How do you feel about the distance from your home to the nearest health center	1. Very close 2. Average 3. Too far	1 2 3	

## **Part V**

<b>Questions for women who have delivered in health facilities</b>				
501	What was the month in which you gave your last birth?	_____		
502	What mode of transport did you use to reach to the health facility?	_____		
503	Why you deliver in health facilities?	1. It was my preference 2. It is my usual practice 3. Based on my previous bad experience from home delivery 4. I was informed to deliver in health facilities 5. I have faced obstetric problems which forced me to deliver in health facilities 99.Others	1 2 3 4 5 99	
504	How do you rate the easiness of getting transportation service?	1. Difficult 2. Fair 3. Easy 4. I cannot assess it	1 2 3 4	

## **Part VI**

<b>Questions for women who delivered at home</b>				
601	What was the month in which you gave your last birth?	_____		
602	Which of the following people	1. Health professionals (SDA)	1	

	have attended your delivery? SDA= Doctor, Health officer, Midwives , Nurse	2. HEWs 3. TBA 4. Relatives or family members 99. Other people, specify_____	2 3 4 99	
603	Why do you deliver at home?	1. It was my preference 2. It is my usual practice 3. Because of previous bad experience from institutional delivery. 4. The labor was going well and I faced no obstetric problems which forced me to go for institutional delivery. 5. I was informed that I can deliver at home 99. Others, specify -----	1 2 3 4 5 99	

**Unka gaaffii qorannoo itti dhiyeenyaa fi haalawwan itti fayyadaminsa tajaajila da'umsa dhaabbilee fayyaatti kennamu waliin wal-qabatan irratti Aanaa Jimmaa Horrootti geggeessuuf qophaa'e**

Waligaltee Afaanii

Wal-baruu

Ashama! Maqaan koo \_\_\_\_\_ jedhama. Miseensa garee ragaa dhimma itti fayyadaminsa tajaajila da'umsa dhaabbilee fayyaatti kennamuu fi haalawwan isaan waliin wal-qabatan irratti funaanuudha.

Qorannoo kana keessatti hammatamuu keessan tajaajila kana cimsuuf tattaaffii godhamuuf bu'aa waan qabuuf gaaffiiwwan hanga daqiiqaa 25 fixuu danda'an isin nan gaafadha. Odeeffannoo isin irraa argannu kana qaama kamiinuu eeyyama keessan malee dabarfame hin kennamu. Qorannoo kana irratti hirmaachuu fi hirmaachuu dhiisuuf mirga guutuu qabdu. Fedha keessan taanaan gaaffiiwwan kanatti aananii jiran isin nan gaafadhati deebii dhugaa ta'e qofa naa deebistu. Itti fufuu?

Yoo fedha hin qaban ta'e galateeffadhuuti mana itti aanuutti darbi.

Maqaa nama gaafatu \_\_\_\_\_

Maqaa to'ataa \_\_\_\_\_

**Kutaa 1<sup>ffaa</sup>**

1. Abbaa warraa adda baasuu

001. Koodii unka gaaffii: \_\_\_\_\_

002. Maqaa Gandaa \_\_\_\_\_

003. Maqaa Garee \_\_\_\_\_

004. Aanaa kanakeessatti hangam jiraatte? Waggaa \_\_\_\_\_ (yoo waggaa 1 gadi ta'e mana itti aanutti darbi)

005. Guyyaa itti yeroo xumuraaf deesse yoomii? \_\_\_\_/\_\_\_\_/\_\_\_\_ [gg/jj/ww/] (yoo waggaa sadii ol ta'e mana itti aanuutti darbi)

Gabatee sagantaa daawwannaa mana

	Daawwannaa 1 <sup>ffaa</sup>	Dawwaannaa 2 <sup>ffaa</sup>	Dawwannaa 3 <sup>ffaa</sup>
Guyyaa			
Kan gaafate			
Firrii (bu'aa)			

006. Firrii(bu'aa) daawwannaa: 1. Guutuu xumureme 2. Kan dide 3. Deebii hin qabu 4. Deebii guutuu hin deebisne 5. Kan biraa

Hub: Maaloo unka gaaffii tokko tokko akka arman gaditti haa guutamu:

Sa'aa itti gaaffi fi deebiin itt jalqabe: \_\_\_\_\_

Sa'aa itti gaaffi fi deebiin itt xumurame: \_\_\_\_\_

## **Kutaa 2<sup>ffaa</sup>**

<b>Gaaffiiwwan hawaasummaa fi ummataa</b>			
Lakk	Gaaffiilee	Filannoo deebii	Darbi
101	Umuriin kee yeroo ammaa meeqaa?	Waggaa _____	
102	Amantiin kee maalii?	1. Musiliima .....1 2. Proteestantii .....1 3. Ortodoksii.....1 4. Kaatolikii.....1 99. Other specify.....1	
103	Haalli heeruma kee maalii?	1. Heerume wajjin jirraanna 2. Iddoo garaa garaa jiraanna. 3. Gargar baaneerra 4. Na jala du'e jira 6. Hin heerumne	
104	Sadarkaan barumsaa kee maalii?	1. Tasa hin baranne 2. Dubbisuu fi barreessuu 3. Sadarkaa 1 <sup>ffaa</sup> [1-8] 4. Sadarkaa 2 <sup>ffaa</sup> [9-10] 5. 10+ 99. kan biraa haa ibsamu _____	
105	Hojiin kee maalinni?	1. Haadha manaa 2. Qonnaan bulaa 3. Hojjettuu [mindeeffamtuu] 99. kan biraa haa ibsamu _____	
106	Sadarkaan barumsaa abbaa manaa kee maalinni?	1. Tasa hin baranne 2. Dubbisuu fi barreessuu 3. Sadarkaa 1 <sup>ffaa</sup> [1-8] 4. Sadarkaa 2 <sup>ffaa</sup> [9-10] 5. 10+ 99. kan biraa haa ibsamu _____	
107	Hojiin abbaa manaa kee maalinni?	1. Qonnaan bulaa 2. Daldaalaa 3. Hojjetaa [mindeeffamaa] 99. kan biraa haa ibsamu _____	
108	Baay'ina namoota mana kanatti galan	Nama _____(baay'ina)	

	yokiin mana keessan keessa jiraatan meeqaa?		
109	Galiin maatii keessan gidduu galeessa waggaatti meeqa ta'aa?	Qarshii_____	
110	Mana keessaa raadiyoo qabduu	1. Eeyyee 2. Miti	Kutaa 2 ffaatti Darbi
111	Torbeetti si'a tokko ni dhageessaa?	1. Eeyyee 2. Miti	

## **Kutaa 2<sup>ffaa</sup>**

<b>Seenaa fayyaa wal hormaataa</b>			
Lakk	Gaaffii	Filannoo deebii	Darbi
201	Umuriin itti yeroo jalqabaaf heerumte meeqaa?	Waggaa _____	
202	Umuriin itti yeroo jalqabaaf ulfoofte meeqaa?	Waggaa _____	
203	Umuriin itti yeroo dhumaaf ulfoofte meeqaa?	Waggaa _____	
204	Tartiiba da'umsa	_____ <sup>ffaa</sup>	
205	Ulfi inni dhiyoo karooraanii?	1. Eeyyee 2. Miti	
206	Yeroo meeqa ulfooftee?	1. Baay'ina ulfaa: _____ 2. Baay'ina ulfi ba'e: _____	
207	Ulfa baste beektaa?	1. Baay'ina ulfi ofisaa ba'e: ____ 2. Baay'ina ulfi fedhiin ba'e: ____	
208	Si'a meeqa deessee?	1. Ijoollee lubbuun jiran: ____ 2. Baay'ina ijoollee du'an: ____ 3. Ijoollee du'anii dhalatan: _____	
209	Ulfa duranii keessatti rakkoo walxaxaa ulfa waliin wal-qabatu si mudate beekaa?	1. Eeyyee 2. Miti	
210	Ulfa isa dhuma keessatti rakkoo walxaxaa ulfa waliin wal-qabatu si mudate beekaa?	1. Eeyyee 2. Miti	
211	Kanaan dura buufata fayyaatti deesse beektaa?	1. Eeyyee 2. Miti	



#### **Kutaa 4<sup>ffaa</sup>**

<b>Gaaffiiwwan itti fayyadama hordoffii da'umsa duraa irratti haadhoolee hundaaf kan dhiyaatan</b>			
Lakk	Gaaffii	Filannoo deebii	Darbi
301	Ulfa isa duraa irratti hordoffii da'umsa duraa argatte beektaa?	1. Eeyyee 2. Miti	
302	Ulfa isa dhiyoo irratti hordoffii da'umsa duraa fudhatte beektaa?	1. Eeyyee 2. Miti	Yoo 2 ta'e kutaa 5 <sup>ffaa</sup> tti derbi
303	Ulfa isa dhiyoo irratti hordoffii da'umsa duraa yeroo dhumaaf eessaa argachaa turte	1. Hospitaala 2. Buufata fayyaa 2. Kellaa fayyaa 3. Kilinika dhuunfaa 99. kan biraa haa ibsamu_____	
304	Si'a meeqa hordooftee?	Si'a _____	
305	Yeroo xumura yeroo ulfoofte kanatti tajaajila hordoffii da'umsa duraa yoom jalqabdee?	1. ji'a _____ <sup>ffaa</sup> tti 2. Hin beeku	

#### **Kutaa 5<sup>ffaa</sup>**

<b>Gaaffiiwwan dubartoota hundaaf dhiyaatan</b>				
Lakk	Gaaffii	Filannoo deebii	Koodii	Darbi
401	Where do you deliver your last child?	1. Manatti 2. Kellaa fayyaatti 3. Buufata fayyaatti 4. Hospitaalatti	1 2	
402	Eenyuu si deessisee?	1. Hojjetaa fayyaa 2. Hojjettuu eksteenshinii fayyaa 3.TBA 4. Firoota koo /Ollaa 99.Kan biraa haa ibsamu__	1 2 3 4 99	
403	Buufata fayyaa ga'uuf hangam deemtaa?	km _____		
404	Buufata fayyaa ga'uuf hangam deemtaa?	_____Hours		
405	Fageenya mana keessanii fi buufata fayyaa gidduu jiru akkamitti ibsitaa?	1. Baay'ee dhiyoo 2. Gidduu galeessa	1 2	

		3. Baay'ee fagoo	3	
--	--	------------------	---	--

### **Kutaa 6<sup>ffaa</sup>**

<b>Dubartoota dhaabbilee fayyaatti da'aniif dhiyaatu</b>				
Lakk Gaaffii	Gaaffii	Filannoo deebii	Koodii	Darbi
501	Ji'a kamitti deessee?	_____		
502	Gara dhaabbilee fayyaatti maaliin deemte?	_____		
503	Maaliif dhaabbilee fayyaatti deessee?	1. Filannoo koo waan ta'eef 2. yeroo hundaa achitti waaniin da'uuf 3. muuxanno koo kanaan dura irraa 4. odeeffannoo qabuu irraa 5. kanaan dura rakkoo waan na mudateef 99. kan biraa _____	1 2 3 4 5 6	
504	Haala tajaajila geejjibaa argachuu akkamitti ibsitaa?	1. Ulfaataa 2. Giddu galeessa 3. Salphaa 4. argachuu hin danda'u	1 2 3 4	

### **Kutaa 7<sup>ffaa</sup>**

<b>Dubartoota manatti da'aniif dhiyaatu</b>				
Lakk Gaaffii	Gaaffii	Filannoo deebii	Koodii	Darbi
601	Yeroo xumura ji'a kam keessa deessee	Ji'a _____		
603	Maaliif manatti deessee?	1. Filannoo koo waan ta'eef 2. Yeroo hundaa achitti waaniin da'uuf 3. Muuxanno koo kanaan dura irraa 4 Rakkoo waan na hin mudateef. 5. Odeeffannoo qabuu irraa 99. Kan biraa	1 2 3 4 5 99	

### Annex: III GPS data collection form

Kebele Name \_\_\_\_\_

No	Date	GPS waypoint No	Latitude(North)	Longitude (East)	Village name	Description
1						
2						
3						
4						
5						
6						
7						
8						

Kebele Name \_\_\_\_\_

No	Date	Departure point			Destination		
		Site name	Latitude(North)	Longitude (East)	Site name	Latitude(North)	Longitude (East)
1							
2							
3							
4							
5							
6							
7							
8							
9							

## **Annex II. Dummy tables**

Table: Selected Socio-demographic characteristics of respondents JimmaHorro Woreda  
April 2012.

<b>Variables</b>	<b>Frequency</b>	<b>%</b>
<b>Current age</b>		
15-19		
20-24		
25-29		
30-34		
35-39		
40-44		
45-49		
<b>Religion</b>		
Muslim		
Protestant		
Orthodox		
Catholic		
<b>Current marital status</b>		
Married and currently living together		
Separated		
Divorced		
Widowed		
Cohabited		
Single[never married]		
<b>Educational status</b>		
Never attended		
Only read & write		
Primary[1 – 8]		
Secondary[9 -10]		

10+
Occupation
House wife
Farmer
Employed[waged]
Husband's educational status
Only read & write
Primary[1 – 8]
Secondary[9 -10]
10+
Husbands occupational status
Farmer
Merchant
Employed[waged]
Family size
Monthly income
< 500
>= 500

Obstetric characteristics of respondents

Variables	Frequency	%
Age at first marriage (in years)		
< 15		
15-19		
20-24		
25-29		
30+		

<b>Age at first pregnancy (in years)</b>
< 20
20-29
30+
<b>Gravidity</b>
2
2-4
>=5
<b>Parity</b>
1
2-4
>=5
<b>Abortion</b>
Yes
No
<b>Birth complications in previous pregnancy</b>
Yes
No
<b>Birth complications in immediate pregnancy</b>
Yes
No

Geographic factors

Variables	Frequency	%
Distance to health center		
=< 5km		
6 – 10 km		

---

11-15

16-20

> 20

---

**Annex IV: Information Sheet and Consent Form English and Afan Oromo version**  
**Title of the Research Project: Geographic Accessibility and factors associated with Institutional delivery utilization among rural reproductive age mothers in Jimma Horro Woreda, Oromia region, Ethiopia, 2012**

**Name of the Organization:** Institute of Public Health, Gondar College of Medicine and Health Sciences, University of Gondar.

**Name of the Sponsor:** University of Gondar

**Name of Principal Investigator:** Kiflom Zegeye

**1. Purpose of the Research Project:** The aim of this study is to assess geographic accessibility and utilization of Institutional delivery and factors associated with Institutional delivery utilization among rural reproductive age mothers in Jimma Horro Woreda, Oromia region, Ethiopia.

**2. Procedure:** The respondent's socio-demographic information will be collected using structured questionnaire via interview. Data on geo-reference coordinates of respondents as well as health facilities locations and routes will be recorded using Global Positioning System (GPS) units. The study involves mothers who gave birth in the past two years prior to data collection in Jimma Horro woreda.

**3. Risk and /or Discomfort:** Participating in this research project will impose no risk. To respond to the questionnaire it will take you about 25 minutes.

**4. Benefits:** There is no direct benefit to you in participating in this research but it helps us in assessing geographic accessibility and utilization of Institutional delivery and factors associated with Institutional delivery utilization and for health sector

administrators, concerned bodies by taking it as a baseline information to strengthen Institutional delivery service access and utilization.

**5. Confidentiality:** The information collected from you will be kept confidential. It will be stored in a file using codes, without your name. And it will not be revealed to anyone except the principal investigator. In addition it will be used only for this particular research but not for other purposes.

**6. Right to Refusal or Withdraw:** You have the full right to refuse from participating in this research. You can refuse not to respond any or all the questionnaires and this will not affect you on using any kind of services from the woreda. You have also the full right to withdraw from this study at any time you wish, without losing any of your right.

**7. Person to contact:** This research project will be reviewed and approved by Institutional Review Board of Institute of Public Health, College of Medicine and Health Sciences, University of Gondar. If you want to know more information, you can contact the following individuals and you may ask at any time you want.

1. Institute of Public Health

P.Box-196, Gondar, Ethiopia

2. Mr. Kiflom Zegeye, Principal Investigator

Mobile: +251913362864 / e-mail: kiflom.zegeye@yahoo.com

3. Mr. Abebaw Gebeyehu (advisor), University of Gondar

Mobile: +251920314519 / e-mail: gabebaw2wirku@gmail.com

4. Mr. Tesfahun Melese, (advisor), University of Gondar

Mobile: +251921576763 / e-mail: tesfahunmelese@yahoo.com



## **Waraqaa Odeeffannoo**

**Mata duree qorannicha:** Itti dhiyeenyaa fi itti fayyadama tajaajila da'umsa dhaabbilee fayyaatti kennamu dubartoota umurii wal-hormaata keessa jiran ta'anii gandoota baadiyyaa aanaa Jimmaa Horroo, Naannoo Oromiyaa, Itiyoopiyaa, 2012.

**Maqaa dhaabbaticha:** institutii fayyaa hawaasa, Koolleejjii saayinisii fayyaa fi medisinii Gondar, Gondar Universiy

**Maqaa qaama ispoonsarii godhe:** Gondar Univarsiitii

1. **Kaayyoo qorannichaa:** Kaayyoo qorannoo kana haala itti dhiyeenyaa fi itti fayyadama tajaajila da'umsa dhaabbilee fayyaatti kennamu dubartoota umurii wal-hormaata keessa jiran ta'anii gandoota baadiyyaa aanaa Jimmaa Horro keessatti jiraatan ilaaluufi.
2. **Tartiiba adeemsa qorannoo:** Ragaa namoota qorannoo kana keessatti hammatamanii wa'ee hawaasummaa fi dhuunfa isaanii unka gaaffii qophaa'een ni funaanama. Ragaa waa'ee iddoo mana hirmaattoota qorannichaa fi dhaabbilee fayyaa akkasumas karaa iddoo gidduu galeessa garee tokko tokko irraa gara buufata fayyaa dhiyoo ta'etti GPS dhaan safarama.
3. **Balaa yokaan miidhaa fi mudachuu danda'u :** Qorannoo kana keessatti hirmachuun balaa yokaan miidhaa isin irra geessisuu kan hin qabne yeroo ta'u, gaaffilee isinan gaafadhu kana hanga daqiiqaa 25 fudhachuu ni danda'a.
4. **Iccitii qabachuu:** Ragaa fedhaa fi eeyyama keessan malee qaama kamiinyyuu kan hin laatamne yeroo ta'u yeroo galmaa'u maqaa keessaniin utuu hin taane koodiidhaanii. Itti dabalees, qorannoo kanan alatti kaayyoo biraatiif hin oolu.
5. **Mirga diduu yokaan addaan kutuu:** Qorannoon kun boordii Gondar University maalummaa qorannoo geggeeffamu ilaaluun madaalamee jira. Ragaa dabalataa yoo barbaaddan yeroo barbaaddanitti namoota armaan gaditti tarreeffamanii jiran argachuu ni dandeessu.

1. Institutii fayyaa hawaasaa  
Lakk. san. poostaa -196, Gondar, Itiyoopiyaa
2. Obbo Kiflom Zagayyaa – Qorataa

Mobile: +251913362864 / e-mail: kiflom.zegeye@yahoo.com

3. Obbo Ababaaw Gabayyahuu(Gorsaa), Gondar Univarsitii

Mobile: +251920314519 / e-mail: gabebaw2wirku@gmail.com

4. Obbo Tasfaahuun Mallasee(Gorsaa), Gondar Univarsitii

Mobile: +251921576763 / e-mail: tesfahunmelese@yahoo.com

## Annex V. Declaration

I, the undersigned, health informatics student declare that this proposal is my original work in partial fulfillment of the requirement for the degree of Master of Public Health in Health Informatics.

Name: Kiflom Zegeye

Signature: \_\_\_\_\_

Place of submission: Institute of Public Health, College of Medicine and Health Sciences, University of Gondar.

Date of Submission: \_\_\_\_\_

This proposal work has been submitted for examination with our approval as university advisors.

### Advisors

Name	Signature
1. Mr. Abebaw Gebeyehu	_____
2. Mr. Tesfahu Melese	_____

## **Annex VI. Assurance of investigator**

The undersigned agrees to accept responsibility for the scientific, ethical and technical conduct of the research project and for provision of required progress reports as pre terms and conditions of the Institutional Review Board of the University of Gondar.

Name of the student: Kiflom Zegeye

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

## **Approval of the advisors**

### **Advisors**

Name	Signature	Date
1. Mr. Abebaw Gebeyehu	_____	_____
2. Mr. Tesfahun Melese	_____	_____